

## Geochemical variations in the Sangihe arc: Fluid and melt slab fluxes in response to slab temperature

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The Sangihe arc, northeastern Indonesia, is an oceanic arc situated in unique tectonic settings where the active arc-arc collision is ongoing in the northern arc sector. The compositional diversity of lavas from south to north in the arc should reflect influx from subducted slab in response to slab components and P-T conditions in the sub-arc mantle. To elucidate magma genesis and slab thermal structure in such a setting, we have obtained new geochemical data for lavas from the entire Sangihe arc. In the southern arc where is away from the collision zone, the across-arc geochemical variation demonstrates that slab component changes in character from low-temperature fluid, through high-temperature fluid, to partial melt from the volcanic front to the rear arc. The geochemical systematics, the estimated mass fraction of the slab component, and the inferred stability of accessory rutile, zircon, and phengite in the slab are all similar to other oceanic arcs, such as Izu arc, indicating that the thermal structure of the slab is not affected by impending collision. In contrast, volcanic front lavas from the dormant northern Sangihe arc are systematically more enriched in fluid-immobile elements than the southern volcanic front lavas. This may be related to advanced collision in the northern arc that could have slowed the subduction rate and heated the slab in the Pliocene followed by cessation of volcanic activity in the Quaternary.

Keywords: subduction zone, slab dehydration, slab melting, Sangihe arc, arc collision